

Facilities Quarterly

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY ♦ FACILITIES DEPARTMENT NEWSLETTER

JULY
2000

Blackberry Canyon Switching Station Powers Up

The Blackberry Canyon Switching Station is up and running! This new switching station, located atop a new concrete cable vault on the old Building 64 cooling



*Inside Blackberry Canyon Switching Station
(photo by Roy Kaltschmidt)*

tower pad (behind the Bevatron), is a 13.8-kV, 1200-amp, 750-MVA, double-ended, self-contained, metal-clad structure. It is a state-of-the-art system, with microprocessor-controlled circuit breakers and remote monitoring and control through the Lab's supervisory, control, and data acquisition (SCADA) system.

Facilities Project Manager Chuck Taberski describes the new switching station as a "complete renovation" of the 12-kV electrical system in the Blackberry Canyon service area. Now, buildings in this area receive redundant (dual) 12-kV cable "feeders," each of which has greater capacity than the feeders it replaces. (Aside from limited capacity, these feeders were up to 40 years old and prone to break, leaving buildings without power and causing disruptions to experiments.) With the new backup capability, there will be far fewer outages, and maintenance personnel will find routine 12-kV system maintenance much easier to perform.

Buildings served by the new switching station include 70, 70A, the 50, 90, and 71 complexes, 88, 65, 51, 54, 55, 56, and 64.

Blackberry Switching Station replaces the inadequate and obsolete Big "C" Switching Station. Along with the antiquated feeders, this old switching station has caused numerous unscheduled outages, the most recent of which shut down NERSC and the Building 70 Complex in February.

The project was submitted to DOE in 1996 and funded in 1998. Construction was accomplished in two phases and has taken two years to complete. Total project cost was \$6.5M. Blackberry Canyon Switching

continued on page 2

Small Projects and Year-End Spending: How to Handle the "Use It or Lose It" Crush

The end of the fiscal year is a busy, often frenetic, time. In addition to meeting government reporting deadlines, scientific divisions within Berkeley Lab often have to quickly decide what small construction projects they need and can finance with supplemental funds from the Lab's operating budget, funds that disappear after September 30.

Since such small projects are often not a top planning priority, they continually get shunted to the bottom of the to-do pile—until August or September arrives and the rush to spend money on small projects begins. An unfortunate result of all this haste can be a project that satisfies no one,

continued on page 2

INSIDE

From the Facilities Manager	2
Focus on Service: Estimating	3
Compliments	3
Construction and You	4
Projects	5

Facilities Quarterly is available online at
<http://www.lbl.gov/Workplace/Facilities>.

BLACKBERRY CANYON *continued from page 1*

Station was completed on time and on budget.

Installation of the new switching station has been a major undertaking, one that has affected the entire Lab. Traffic delays and road closures occurred throughout the summer of 1999 while the duct bank and manhole systems were installed. Nine shutdowns have been scheduled for 2000 to complete final

connections to the various buildings.

The Blackberry Canyon Switching Station Replacement Project is the fourth and final phase of a ten-year program to upgrade the Laboratory's electrical distribution infrastructure. Taberski expects that this new electrical system "will meet the growing needs of the Laboratory's research mission well into the 21st century."



FROM THE FACILITIES MANAGER...

We have been thoroughly reviewed this past quarter. Our Peer Review came through with good marks, but we did receive some negatives in customer communications. The Landlord Review was

also favorable about our commitment to maintenance. We also passed our first (and maybe last) External Independent Review. The EIR is planned as a review of Line Item Projects to ensure they will be managed properly. Although we did extremely well, DOE will probably exclude smaller LIPs in the future. No, it doesn't end there. The new project management group in DOE also required a more rigorous CD-0 and CD-1 (Critical Decision). We managed to obtain both approvals for our domestic water project in FY 2001 and a new building in FY 2002. In short, we did very well.

Our Appendix F performance measures are up for their annual review and we expect to repeat last year's successes, except for unplanned electrical outages. Big C had more than we expected, but it has now been cut out of the system with the completion of our last electrical system upgrade. Our thanks to those who had to put up with the road closures while we constructed duct banks and pulled cable. A round of applause to Chuck Taberski for dealing with the contractors, the complaints, and the Campus.

A recent rash of preventable accidents has put us over last year's numbers. I stress the "preventable" because most were due to simple carelessness and not following the basic safety rules. Starting July 1, a safety expectation will be added to everyone's performance evaluation to stress the responsibility of each of us in preventing accidents. I will also be personally reviewing every accident with the injured worker, and her/his supervisor and manager. The goal of this review is not discipline, but to find out how the department can reverse the present trend and make the Laboratory a safer place to work. The important thing to remember is that accidents are not numbers but real injuries to fellow workers or ourselves.

Bob Camper

Work SMART...

WORK SAFELY...

If it is not safe, STOP the work.

Small Projects

continued from page 1

neither scientists or Facilities personnel.

Chief Estimator John Eastman and Bill Wu, Facilities Small Project Group (SPG) manager, want to change this situation. Eastman stresses the benefit of early requests for estimates or engineering studies. "Most people at the Lab are not particularly conscious of the construction cycle that can often slow projects," he explains. "Small projects require (at the least) an initial contact, an explanation of requirements, a preliminary design and conceptual estimate, a review with the client, and finalization of design and estimate—all before construction can begin. This cycle can run several weeks." Early estimates also enable divisions to decide what projects are truly feasible, since the Facilities estimator is familiar with code and safety compliance regulations and other issues that the interested division might not have foreseen. (Note that asking for an estimate does not commit a division to any action on a project.)

The SPG includes staff members from all the design disciplines (architectural, civil and structural, electrical and mechanical), and a work structure that emphasizes close communication among these disciplines. With this interdisciplinary structure, the SPG is able to handle a wide range of design and construction work. They are, however, constantly looking for ways to make projects function more smoothly. Wu has participated in end-of-year construction activities for many years and has come up with some suggestions for divisions looking to start construction projects:

Now, July, is the time to start year-end projects. Earlier planning saves money. During September, because of the work crunch, Facilities craftspeople need to work overtime. Overtime work, whether done by in-house personnel or subcontractors, costs money.

The longer a division waits, the more likely contract labor will be required. As the work intensifies in September, Facilities relies on contract labor to provide needed personnel. Contractors have higher rates than LBNL craftspeople.

More on subcontracting (and saving money): The more time Facilities has to set

continued on page 6

FACILITIES DEPARTMENT

Facilities provides Berkeley Lab with a full range of architectural and engineering, construction, and maintenance services for new facilities and for modification and support of existing facilities.

Architectural and engineering services include facility planning, programming, design, engineering, project management, and construction management. Maintenance and construction functions include custodial, gardening, and lighting services; operation, service, and repair or replacement of equipment and utility systems; and construction of modifications, alterations, and additions to buildings, equipment, facilities, and utilities. Additional services include bus

and fleet management, mail distribution, stores distribution, property management, property disposal, cafeteria operations, and electronics repair.

Ongoing Facilities activities include renewal and upgrade of site utility systems and building equipment; preparation of environmental planning studies; in-house energy management; space planning; and assurance of Laboratory compliance with appropriate facilities-related regulations and with University and DOE policies and procedures.

The Work Request Center expedites facility-related work requests, answers questions, and provides support for facility-related needs.

FOCUS ON SERVICE: Estimating

What goes into an estimate? Whether it's for a new building or a new cubicle, a construction project usually involves more than meets the eye, and construction at Berkeley Lab is no exception. Many factors need to be considered in determining job cost. These relate not only to the scope of work, but also to a host of other considerations that make construction at Berkeley Lab...well, unique.

Chief Estimator John Eastman explains: "Berkeley Lab is like a self-contained city, and even a small job can ripple back on the infrastructure. Our estimates need to take special conditions at the Lab into account—alarm systems, radiation and hazardous material areas, ventilation systems, backup cooling and power systems, safety structures such as blowout walls, and so on."

"Many scientific programs cannot be interrupted, so we need to provide workarounds and workaround systems, such as temporary water lines. We can't just shut down the ALS, for instance. We need to work in buildings that are occupied, and this requires schedule adjustments, overtime, and night and weekend work." To minimize impact on research, projects may also include provisions for controlling dust generation, or avoiding certain construction methods.

Access to some laboratories is carefully controlled and monitored. For small projects in particular, this can be very time consuming.

Engineering design for Berkeley Lab's mission-critical systems demands a higher level of reliability than is common elsewhere, so we have redundant power, emergency generators, backup HVAC, and labwide monitoring systems. Some facilities have extreme utility requirements. Clean rooms require exceptionally stringent control of HVAC, and accelerators and other major scientific equipment have extraordinary electrical requirements. And Berkeley Lab is designing and installing systems that are on the threshold of scientific knowledge. Consequently, there is guesswork and rework required as the design process goes forward.

Topography also presents difficulties that are reflected in project cost. Our narrow, winding roads make construction deliveries difficult. For example, trucks hauling standard 60-ft trailer units must be accompanied by a forklift, needed to pick up the tail end of the trailer and jockey it around some of the tighter curves. Finding enough space

continued on page 6

COMPLIMENTS

Mike Press of Engineering was among those displaced by the Building 29 evacuation. Now settled in Building 62, he offers his commendations to Sam Birky and Fred Mecum: "Their attitude throughout the whole ordeal seemed to be one of 'CAN DO, WILL DO'! ...Further, Ron Woods and his moving crew did an outstanding job of moving a huge amount of 'stuff' in a very short time and Rod Bennett provided excellent and rapid carpentry service..."

Janice Magee writes, "On behalf of the Directorate, I would like to commend Dick Dickey for his continued efforts and professional manner during this past year. Specifically, we have hundreds of students and ~ 30 teachers this summer and Dick has done his best to accommodate space for a computer lab and workstations."

ISS Department Head Carl Eben reports that his new ergonomic keyboard tray "...looks and works great....Al Campo and John Souza did an excellent, timely job on this. They listened to my needs and professionally responded to them. They have a happy customer."

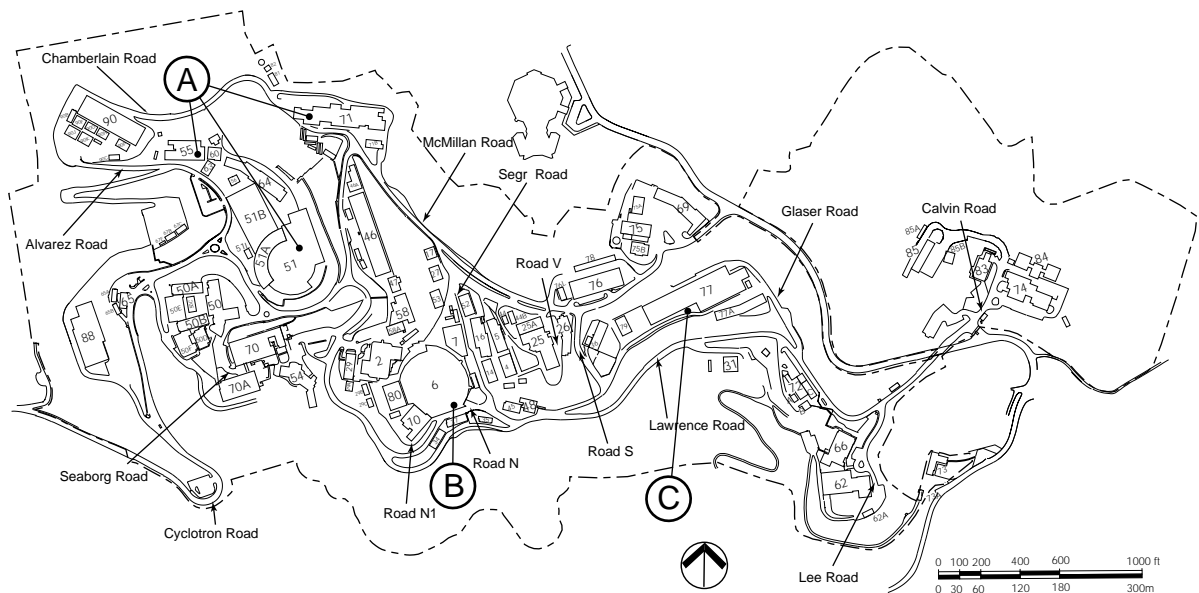
WORK REQUEST CENTER

Telephone	6274
Fax	7805
E-Mail	WRC@lbl.gov
Mailstop	76-222
Web	web3.lbl.gov/wrc

WRC welcomes questions or comments about Facilities Quarterly.

CONSTRUCTION AND YOU

Current construction projects affecting parking, or vehicular or pedestrian circulation



Project Contacts. The name in parentheses after each project is the Project Manager (PM) or other person who is responsible for project oversight: coordinating all phases from design through construction; controlling cost, scope and schedule; and ensuring client satisfaction. This person will be happy to answer any questions about the project.

Bldg 51, 65, 71: Unit Substation Replacements

A	JULY	AUG	SEPT
----------	-------------	------------	-------------

There will be repeated day-long power shut-downs in the affected buildings on weekends.
(Chuck Taberski, x6076)

Bldg 77: Rehabilitation of Building Structure and Systems

JULY	AUG	SEPT	C
-------------	------------	-------------	----------

Construction is scheduled to start in August around the building perimeter and in selected areas within the building. Laydown areas will be located adjacent to Building 77 and Glaser Road.
(Lonny Simonian, x6088)

Bldg 6: 2nd Floor Office & Lab Buildout

B	JULY	AUG	SEPT
----------	-------------	------------	-------------

Parking spaces along the south side of Bldg 6 will be reserved for contractor use. (Richard Stanton, x6221)

“CAUTION—CONSTRUCTION AREA”

Construction barricades and warnings are there for your protection. Under no circumstances should you cross a construction barricade, or disobey posted warnings or directions. Contact the Project Manager for escorted access to construction areas.

ON THE DRAWING BOARD

projects in study or conceptual design

Advanced Light Source Nanoscience User Facility

Now in conceptual design, the proposed facility includes 40 laboratories to support ALS users. In addition, the building would provide 300 offices, a user support center, conference rooms, and training areas. Preliminary plans call for a 90,000-SF (8,500-m²) structure to be located immediately adjacent to Building 6 (the Advanced Light Source) in the Old Town area. (Chuck Taberski, x6076)

Administrative Services Building

Planning is going forward on a new 30,000-SF (2,900-m²) building that will house key Berkeley Lab administrative functions now scattered across the site. This "Town Center" will be located on the site of Building 29, which will be demolished. Its central location will allow efficient administration and easy access for all staff and guest researchers. (Richard Stanton, x6221)

Bevalac Decontamination and Decommissioning

Now in the planning stage, this project will remove and dispose of the former Bevalac heavy-ion accelerator and many associated structures. Slated for removal are the entire Building 51 complex, the western portion of the Building 71 complex (including the accelerator, injectors, experimental caves, control rooms, and associated shops and support spaces), and Building 71A. (Dave Tudor, x4171)

Rehabilitation of Site Mechanical Utilities, Phase 2

This project will extend the useful lives of the natural gas, low conductivity water (LCW), compressed air, and storm drain systems. All service risers in the natural gas system will be replaced with nonmetallic pipe. LCW system aluminum pipe will be replaced with stainless-steel pipe. Cathodic protection will be added to the compressed air system. Steel pipe in the storm drain system will be replaced or relined. Facilities has prepared a conceptual design report for FY2002 funding consideration. (Lonny Simonian, x6088)

Sitewide Water Distribution Upgrade, Phase 1

Much of Berkeley Lab's fresh-water supply system has been in place for over 30 years. This project will replace about 0.9 mile (1.5 km) of cast iron pipe and upgrade the remaining 5 miles (8 km) of pipe with corrosion protection, new valves, pressure reducing stations, improvements to an existing water storage tank, and a new water storage tank in the East Canyon area. Facilities has prepared an updated conceptual design report for FY 2001 funding consideration. (Charles Allen, x6438)

Operations Building

Conceptual design is underway for a multiple-use building for Operations. The new structure is planned at approximately 2300 sq m (25,000 sq ft). (Danica Truchlikova, x6511)

IN PROGRESS

funded projects

Bldg 88: Seismic Anchoring

Architectural and engineering final design has begun to seismically reinforce caves 1 through 5. Phase 1 for cave 4 is currently under construction. (Lonny Simonian, x6088)

JGI - Production Sequencing Facility

The final phase of outfitting Building 400 is complete, and the tenant is moving in. This project completes the second JGI sequencing facility with the installation of lab casework, furniture and research equipment. The JGI occupies two sequencing facilities totaling 56,000 sq ft in Walnut Creek. (Richard Stanton, x6221)

Bldg 6: Laboratory and Office Buildout

This project will build out approximately 1,100 sq m (12,000 sq ft) of laboratory, office, and research support space in the existing unfinished area on the second floor of Building 6. (Richard Stanton, x6221)

Bldg 77: Rehabilitation of Building Structure and Systems

The Architect/Engineers have completed final design, and the structural portion of work is out for bid. construction sequencing is being finalized. This project will arrest differential settlement of Building 77, replace building cross bracing, and realign bridge crane runways. Upgrades to the building HVAC system and addition of thermal insulation will improve temperature controls, supporting the building's precision-engineering mission. Other improvements will include building architectural and electrical system upgrades. (Lonny Simonian, x6088)

FOCUS ON SERVICE *continued from page 3*

for laydown areas is a perennial problem; almost any construction storage site is obtained at the expense of parking. And since the road system offers few alternative routes for getting from point A to point B, almost all roads must be kept open and traffic controls used.

Our hillsides add to the cost of sitework with retaining walls, steps, and extra foundation work. Unstable soil in many areas requires deep piles or other stabilization techniques. Slopes are sometimes so steep that lifting mechanical equipment off a roof can't be done with a crane, but requires a helicopter at thousands of dollars per hour.

Safety is another major consideration. "We play by the rules on health and safety concerns such as asbestos, lead point, and live electrical circuits," says Eastman. "We insist that everybody adhere to all safety programs. All excavations must be fully

shored, and workers must use fume detectors. Contractors must submit detailed safety plans before setting foot onsite. In general, the Lab requires much closer adherence to safety requirements than is typical in the private sector."

As a federal facility, Berkeley Lab must abide by the Davis-Bacon Act, which requires the payment of prevailing wage rates on federal construction projects in excess of \$2,000, and the Stull Bill, which compels LBNL to use outside contractors for many jobs, even though their rates are higher. Also adding to cost are the formal procedures for bidding and change orders that are necessary when using contractors. Selecting a contractor requires a procurement cycle, and the low bid must be considered. Change orders must go through purchasing and meet more stringent documentation requirements.

Finally, there is the matter of Laboratory burden and overhead charges. Suffice it to say they can more than double the cost of a typical Facilities project. (See this page for breakdowns of burdens and overheads for a typical project and purchase order.)

All this means that undertaking even a modest project can be daunting. In recent years, Facilities has worked to support clients in initiating and planning their projects, establishing the Work Request Center as the "one-stop shop" for all Facilities work and restructuring to provide a more streamlined design and construction service. An important component of this service is estimating, which can be invaluable in helping clients define the scope and method of performance for both large and small construction projects and, moreover, in answering that most central question, "How much will it cost?"

SMALL PROJECTS

continued from page 2

up the subcontracting agreement, the better the price Facilities can obtain to complete work within the limited time.

Ordering equipment and furniture takes time. A Steelcase furniture order usually takes six weeks minimum, eight to be safe. The normal lead time for HVAC equipment is six weeks plus time for installation.

Starting a small project is easy: a call to the Work Request Center is all that's required. SPG responds to work requests in a week or less. The SPG can also do preliminary estimates for unfunded projects—these take from a few hours to a week.

The message is clear: *don't wait*. It will be a happier experience for everyone if divisions take (comparatively little) time now to decide how best to spend end-of-year construction funds.

TYPICAL FACILITIES OVERHEAD AND BURDEN CHARGES

These are typical examples. The application of burdens and overheads varies with type of employee, division, kind of funding, type of project, etc.

Typical Facilities Labor Costs		\$/Hour
Salary		30.00
Career payroll burden (36%)*	10.80	
Subtotal		40.80
Facilities organizational burden (17.50%)**	7.14	
Subtotal (typ. labor cost on O/H proj)		47.97
Site support overhead (20%)	9.59	
Subtotal		57.53
G & A overhead (20.50%)	11.79	
Total (typ. labor cost on DOE project)		69.32
Markup on salary on DOE project	2.31	

Regular Purchase Order Cost		\$
Purchase order (PO) amount		5,000.00
Procurement burden (4.60%)	230.00	
Material handling burden (4.80%)	240.00	
Subtotal burdens		470.00
Subtotal (typ. PO cost for O/H project)		5,470.00
Site support overhead (20% of burdens)	94.00	
G & A overhead (20.50% of burd., SS O/H)	115.62	
Subtotal overheads		209.62
Total (typ. PO cost for DOE project)		5,679.62
Markup on PO for DOE project	1.136	

KEY

 = Overhead (DOE projects only)

* salary x payroll burden
 ** % of (salary + payroll burden)

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor The Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial products, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or The Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or The Regents of the University of California. Ernest Orlando Lawrence Berkeley National Laboratory is an equal opportunity employer.